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REMARKS

By Office Action mailed September 29, 2003, pending claims 1-20 stood rejected, reconsideration of which is respectfully requested in view of the following remarks. Claims 1-75 are now pending, and claims 1-20 are under consideration.

Election/Restrictions

Applicants acknowledge election of Group I, claims 1-38, by way of the Response to Restriction Requirement and Election of Species filed July 21, 2003. Applicants further acknowledge election of claims 1-20 for purposes of initial examination and request that claims 21-38 be examined within the context of this application should the Examiner consider claims 1-20 to constitute patentable subject matter.

Information Disclosure Statement

Applicants note that the Office Action Summary indicates that the Information Disclosure Statement filed March 14, 2002 was considered by the Examiner, however, a copy of the initialed form was not attached to the Office Action. Applicants kindly ask that a copy be forwarded along with the Examiner's next paper.

Rejection Under 35 U.S.C § 102(b)

Claims 1-2, 5-6 and 19-20 stand rejected under 35 U.S.C. §102(b) as anticipated by Shioiri (U.S. Patent No. 5,026,536). More specifically, the Examiner states that Shioiri discloses an apparatus comprising "a first bed having an inlet for receiving a hydrocarbon stream and comprising a metal oxide (col. 3, lines 51-60), *a second bed downstream of the first bed (col. 3, lines 62-68)*, and a third bed comprising copper-zinc adsorbent and being located downstream of the first bed (col. 4, line 21)." (Emphasis added.)

Applicants respectfully disagree with the Examiner's reading of Shioiri. As clearly indicated in the cited passage, what the Examiner characterizes as a "second bed" in Shioiri is a steam reformer containing a catalyst for carrying out a steam reforming reaction. A steam reformer is not part of a desulfurization unit, nor is the disclosed nickel metal reforming

catalyst a nickel adsorbent bed. To the contrary, as noted by Shioiri, in particular at col. 1, lines 47-52, desulfurization is a different, and independent, process from steam reforming.

Accordingly, Applicants submit that Shioiri does not disclose every element of pending claim 1, namely, a desulfurization unit comprising a first adsorbent bed, a nickel adsorbent bed downstream of the first bed, and a guard bed downstream of the first bed, and request that this ground of rejection be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claims 1-6 and 19-20

Claims 1-6 and 19-20 stand rejected under § 103(a) as being unpatentable over Taylor et al. (U.S. Patent No. 5,882,614) in view of Shioiri. This rejection is based on the Examiner's opinion that, as set forth on page 4 of the Office Action, Taylor discloses an apparatus comprising a first bed 46 having an inlet for receiving a hydrocarbon stream and comprising a metal oxide (zinc oxide), a second bed 52 located downstream of the first bed 46, and a third bed 84 comprising a zinc adsorbent located downstream of the first bed 46.

Applicants respectfully disagree with the Examiner's characterization of the apparatus disclosed in Taylor for the following reasons.

Taylor describes a process for reducing the sulfur content of a gaseous hydrocarbon by contacting the gas with two different solid chemisorbents (adsorbents), the first comprising zinc oxide and the second comprising nickel, to produce a sulfur reduced gas (col. 2, lines 10-24). Taylor also describes feeding the sulfur reduced gas to a fluid bed syngas generator (FBSG) to produce a syngas, which may further be contacted with zinc oxide (col. 2, lines 51-62).

In this way, beds 46 and 52 are part of a desulfurization unit. Bed 84, however, is located downstream of the FBSG unit 60, as shown in Figure 2 of Taylor. As bed 84 is not located upstream of the sulfur-sensitive catalytic fuel processing components (e.g., FBSG unit 60), Applicants submit that, contrary to the Examiner's assertion, Taylor does not disclose a desulfurization unit comprising a third "guard" bed, as recited in pending claim 1. At the most, bed 84 of Taylor may be characterized as a second, separate desulfurization unit.

Furthermore, Taylor discloses contacting hydrocarbon gas with “primarily or solely” the zinc oxide and nickel absorbents (col. 3, lines 38-41). Taylor further states that if other absorbents are used “the sulfur content of the gas is higher than the low sulfur levels achieved … according to the process of the present invention” (col. 3, lines 38-46). In addition, Taylor contains no teaching or suggestion that bed 84 could be located upstream of FBSG unit 60 and, as disclosed, the hydrocarbon gas contacted with beds 46 and 52 is not the same as the syngas contacting bed 84. Accordingly, Applicants submit that Taylor does not provide any motivation to a person of ordinary skill in the art to modify the two-bed system disclosed therein to include a third bed. Indeed, by disclosing that other configurations produce inferior results, it is arguable that Taylor teaches away from the three-bed desulfurization unit of the present claims.

The teachings of Shioiri do not rectify the deficiencies of Taylor. Shioiri teaches contacting a hydrocarbon feed with a nickel-containing adsorbent. In Example 4, a kerosine [*sic*] feed was contacted with a conventional desulfurization catalyst (col. 6, line 67 through col. 7, line 9). This is conventional hydrodesulfurization, as described in the present application, and does not comprise an adsorbent bed according to the present claims. The treated kerosine was then subjected to steam reforming and the reformat was further contacted with a CuO-ZnO-Al<sub>2</sub>O<sub>3</sub> catalyst (col. 7, lines 20-36). Shioiri does not teach or suggest that the CuO-ZnO-Al<sub>2</sub>O<sub>3</sub> catalyst could be moved upstream of the steam reformer. Thus, Shioiri does not provide any motivation to a person of ordinary skill in the art to modify the two-bed system in Taylor in the manner suggested by the Examiner to produce the desulfurization unit of the present claims.

In view of the foregoing, Applicants respectfully submit that neither Taylor nor Shioiri, alone or in any combination, contain any teaching, suggestion or motivation to modify the apparatus disclosed therein in order to produce the claimed desulfurization unit of the present invention. Accordingly, Applicants submit that the cited references fail to establish a *prima facie* case of obviousness against claims 1-6 and 19-20, and request that this ground of rejection be withdrawn.

Claims 7-18

In addition, claims 7-18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Taylor in view of Shioiri as applied to claims 1-6 and 19-20, and further in view of Voecks et al. (U.S. Patent No. 5,057,473), Nieskens et al. (U.S. Patent No. 4,673,557) and van der Wal et al. (U.S. Patent No. 4,478,800). This rejection is based on the Examiner's conclusion that claim 1 is unpatentable over Taylor in view of Shioiri, namely, that the modified apparatus of Taylor is substantially the same as that of the instant claims. However, as set forth above, Applicants traverse this rejection of claim 1 and submit that claim 1 is not obvious over such references. Accordingly, as claims 7-8 all ultimately depend from claim 1, Applicants submit that the cited references fail to establish a *prima facie* case of obviousness against claims 7-8 and request that this ground of rejection also be withdrawn.

In view of the above remarks, allowance of claims 1-38 is respectfully requested. A good faith effort has been made to place this application in condition for allowance. However, should any further issue require attention prior to allowance, the Examiner is requested to contact the undersigned at (206) 622-4900 to resolve the same. Furthermore, the Commissioner is authorized to charge any additional fees due by way of this Response, or credit any overpayment, to our Deposit Account No. 19-1090.

Respectfully submitted,

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